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Design of a mid-IR immersion echelle grating spectrograph for remote sensing

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ABSTRACT

We describe the design of a silicon immersion grating spectrograph for the remote detection of chemicals in the atmosphere. The instrument is designed to operate in the two atmospheric windows from 2.3 to 2.5 and 2.8 to 4.2 microns at a resolution of 0.1 cm^{-1}. This is achieved by cross dispersing a high order silicon immersion echelle (13.5 grooves/mm) and a first order concave grating operating in a reflective configuration to generate a two-dimensional spectrum in the image plane with diffraction limited performance.

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